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# AMERICAN CITY & COUNTY

administration · engineering · operations

Profile: APWA's Carl Wills

Facing the Wastewater Challenge

## Enlightened Public Works

Special APWA Convention Preview

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BPA

September 1986 Vol. 101, No. 9

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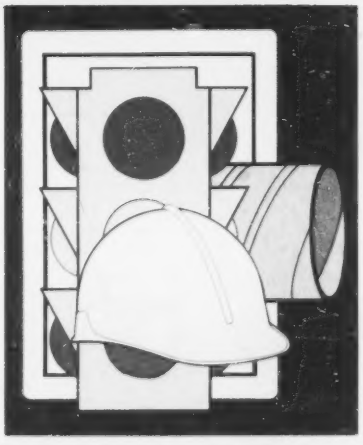
70 Wastewater Challenges



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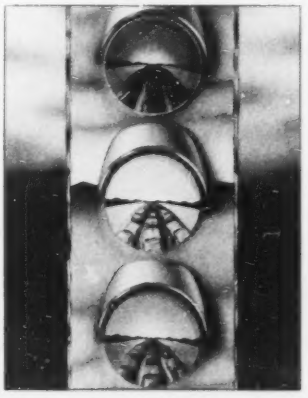
The public is no longer the benign and silent recipient of services. Enlightened public works officials have involved citizens in the planning, delivery and support of these services, creating allies within the community. (Photograph by Terri Teague of Atlanta.)



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# Facing The Challenge

## As the federal government phases out its financial role in providing wastewater treatment facilities, local governments are taking on more responsibility.

*Photograph courtesy of Envirex*

Today, public officials are in the midst of a transitional era in which federal construction grants are being phased out and states and municipalities are regaining lead responsibility in providing for wastewater treatment needs. States, localities and the U.S. Environmental Protection Agency (EPA) are redefining their roles in a partnership committed to continued pursuit of national water quality goals. The critical challenge for states and municipalities is to continue to attain and maintain compliance during and beyond the transition of the federal grants program.

This is a multi-faceted challenge for many communities. Even as grants are being phased out, the July 1, 1988, deadline for compliance with the Clean Water Act is approaching rapidly. According to EPA, 1,325 major and 3,400 minor publicly owned treatment works in the United States need construction to meet statutory requirements. That translates into a lot of still-polluted water being discharged into streams, rivers and lakes.

More than 15 years ago, the United States made a national commitment to tackle this challenge aggressively. Wide public support and bipartisan consensus in Congress resulted in enactment of the Clean Water Act (CWA) in 1972. The act provided for a strong initial fed-

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*Communities now are facing lawsuits over failure to comply with wastewater treatment standards, and the Environmental Protection Agency foresees no extension of the 1988 compliance deadline. In this article, EPA Assistant Administrator of Water Lawrence Jensen gives the agency's view of this controversial and rapidly developing problem.*

*By Lawrence Jensen*

# Nassau County Modifies Plant with MOPO Plan

*By John F. Caruso, Joseph A. Husband and Paul L. Busch*

Planning a modification program for an existing wastewater treatment plant often requires far more effort than building a new facility. Construction phases must be prioritized and planned carefully, so everyday plant operations are not disrupted.

Nassau County, New York, has approached the $200 million modification of the Cedar Creek Water Pollution Control Plant in Hempstead with a priority planning strategy designed to accommodate contractors and residents. Cedar Creek was designed originally to provide secondary treatment for 45 mgd of wastewater from southeast Nassau County. Now receiving above-design flows, the plant must be upgraded to treat 76 mgd by the year 2005. To complicate the project, complaints about odor have increased.

An overall facility planning report was written by Camp, Dresser & McKee, evaluating and recommending current and future wastewater facility needs. The renovation was divided into 10 construction phases, each with a different contracting team, to allow uninterrupted plant operations and limit the number of construction workers entering the park each day. The county used a flexible approach called MOPO — Maintenance of Plant Operations — to plan and design project phases and, within individual contracts, to establish construction sequences. The purpose of MOPO is to minimize potential adverse effects of new construction on plant operations, and to anticipate as many problems as possible before construction begins.

To coordinate MOPO strategy with Cedar Creek's regulatory, financial, physical and operational constraints, the county contracted Malcolm Pirnie Inc., an engineering firm, and other specialists such as Charles F. Vachris Consulting Engineers (foundation and excavation), O'Brien & Kreitzberg Associates (detailed costs) and Product Control Associates (construction schedule). Working with county representatives, a program was developed consistent with the ever-changing funding availability and continual reevaluation of operating information.

"We required a team that could look beyond the nuts and bolts of design," explains Frank J. Flood, the county's director of environmental engineering. "It had to be aware of other non-technical issues such as, how do we keep Cedar Creek a good neighbor to the surrounding community during construction, and how will this new construction affect the operations of the facility?"

"The designers on the Cedar Creek plant have been very good in requesting and using information from the operations group, and in keeping us informed of what is being planned," notes County Director of Environmental Operations James A. Oliva, "This will benefit the project immeasurably during construction and with less confusion and less interference by the contractors on our operation of the plant."

The first two construction phases at Cedar Creek are geared toward improving the reliability of the existing wastewater and solids-handling facilities, and controlling odors at the existing influent pump station, grit-handling and digester complex. During the third construction phase, the energy-intensive equipment (blowers and engine generators) will be improved, and the aeration tanks and secondary clarifiers built.

The aeration tanks will be constructed before the new primaries because they will yield a greater improvement in effluent quality. Similarly, additional power availability is necessary before major new power-using equipment, particularly the aeration tank blower, can be installed and operated.

Thus far, with about half of the program in various stages of bidding and construction and the other half waiting for future funding, Nassau County has found MOPO to be working well in helping the Cedar Creek construction program come in on-schedule and within budget — while keeping operations under control. □

*John F. Caruso is deputy commissioner of public works in Nassau County, N.Y. Joseph A. Husband is project engineer and Paul L. Busch is vice president and director of wastewater activities for Malcolm Pirnie Inc., White Plains, N.Y.*

eral role to catalyze effective and rapid implementation of this ground-breaking legislation. The nation's waters were fouled and an extraordinary infusion of funds was necessary to help municipalities catch up with the huge backlog of unmet wastewater treatment needs.

During the 1970s, EPA funded billions of dollars of wastewater treatment projects, wrote the regulations, set minimum standards, issued the permits, and funded monitoring and enforcement work involved in assuring compliance with the enforceable requirements of the act. During this period of intensive federal spending, states were building staff and technical expertise that resulted in the capable administration of their environmental programs. Today, 49 states have the lead role for day-to-day administration of their construction grants programs.

Reflecting this increased state water quality program management capability and the need to reduce the federal deficit, the 1981 amendments to the Clean Water Act confirmed and accelerated the transition from intensive federal involvement to greater state and local self-sufficiency. While needs for wastewater treatment remain high, the initial or subsequent amendments to the CWA were never intended to keep the federal financial assistance program operating forever.

Legislative history shows that even while the CWA was being written in 1972, Congress conceded that funding levels would be "subject to the usual presidential responsibility for evaluating these needs in relation to other national priorities." Congress further specified that "funding provisions dealt with the need to catch up with the backlog of wastewater construction needs and that municipalities would be expected to provide for operation, maintenance, expansion and replacement of their treatment works through user charges."

This principle was reinforced in the legislative history to the 1981 amendments that stated, "It is important to avoid giving states and municipalities the impression that federal funding will be available in perpetuity to meet all of these localities' described needs." And so, the 1981 amendments reduced the federal contribution from 75 percent to 55 percent for most projects, tightened eligibilities to focus on municipalities with the most pressing treatment needs for existing populations, and reduced the overall funding level for the program.

The federal role also narrowed due to the growing influence of external forces on a program that had operated for years relatively unaffected by major trends occurring within government and across the nation. Specifically, these trends included deficit-reduction ef-

# Revolving Loan Programs

Currently, 12 states are operating state revolving loan programs to finance wastewater treatment facilities and other infrastructure needs. The U.S. Environmental Protection Agency's Office of Municipal Pollution Control has compiled the following analysis of these 12 programs.

**Sources of funding and the needs of each of 12 states with State Revolving Fund Programs (in millions of dollars)**

| State | State Appropriation | State* Authorization | 1984 Eligible Needs | Future 2000 Unrestricted Needs |
|---|---|---|---|---|
| | $ | $ | $ | $ |
| California | 0.0 | 250—G.O. | 4,140 | 6,674 |
| Georgia | 20.0 —Initial | 0 | 989 | 1,652 |
| Montana | 0.0 | 250—Rev.<br>5—G.O. | 61 | 87 |
| New Jersey | 0.0 | 190—G.O. | 4,562 | 4,934 |
| Ohio | 100.0 —Initial | 0 | 4,400 | 5,075 |
| Oklahoma | 25.0 —Initial | 52—Rev. | 395 | 655 |
| Texas | 0.0 | 600—G.O. | 2,733 | 4,770 |
| Utah | 22.5 —Initial | 300—G.O. | 377 | 718 |
| Virginia | 0.5 —Initial | 300—G.O. | 1,305 | 1,670 |
| Washington | 20.0—Annual | 0 | 2,888 | 3,781 |
| West Virginia | 8.9 —Initial<br>5.0—Annual | 0 | 1,903 | 2,084 |
| Wyoming | 100.0 —Initial<br>15.0—Annual | 60—G.O. | 36 | 66 |
| Subtotals: | 276.9 —Initial<br>40.0—Annual | 302—Rev.<br>1,705—G.O. | | |
| TOTALS: | $316.9 | $2,007 | $23,789 | $32,166 |

*Total borrowing authorized since beginning of operation.

forts, tax reform, and a general move to greater state and local responsibility and control.

With these developments, the federal leadership in wastewater treatment clearly showed limited effectiveness. The attainment of state and local financial self-reliance was seen increasingly as a necessary, though challenging, outcome of the program's final years. Ultimately, responsibility for municipal wastewater treatment would have to resume its appropriate place alongside other municipally provided services.

Although on target, this observation was no revelation at City Hall. As federal involvement was diminishing, a parallel change was occurring in local perception away from a reliance on, and expectation of, federal funding and leadership. More than occasionally, city management had become frustrated with the cumbersome requirements attached to federal construction grants or with waiting to move up on their state's priority list. EPA has identified several dozen communities that chose not to wait, but rather to proceed on their own and build facilities suited to their needs with their own funds.

This trend toward increased local initiative is attested by the 1984 comments of the Water Pollution Control Federation (WPCF). The WPCF recognizes the problems inherent in a centrally prescribed program and concludes, "It will be desirable to replace the grants program with other initiatives that directly promote self-supporting utilities, (and) that during this transition it will be far better to provide incentives for efficient plant construction and operation than it is to provide direct subsidies."

The era of high federal spending has produced significant benefits and successes. The CWA compliance attained by municipalities translates into real improvements in environmental quality, public health and aesthetic pleasures. Improved treatment levels and compliance rates have enhanced the recreational use and economic value of waterfront areas.

In addition, treatment plants built with the capacity to serve future needs allows planned growth to occur in an environmentally sound manner. Providing adequate wastewater treatment facilities has improved public health conditions and continues to protect drinking water sources.

In short, as the end of an era approaches, significant improvement can be seen in the nation's water quality. Since 1972, the compliance rate for major dischargers has increased from 33 percent to 79 percent, and approximately 3,500 municipal treatment plants were completed under the construction grants program. These facilities serve 73 million people, and protect the water quality of 24,000 miles of streams and rivers.

Clearly, given the immense amount of work remaining, EPA cannot afford to be lax on enforcement. As the July 1988 compliance deadline nears, the agency has increased its enforcement efforts to assure that national progress toward the goals of the Clean Water Act is maintained regardless of changes in federal funding levels.

Realistic constraints experienced by communities and states led Congress to extend the compliance deadline twice, but there is no indication that another delay is possible. Municipalities must make every effort to attain compliance even without federal funds, because the law is clear that this requirement is not contingent on the availability of federal aid.

Ironically, agressive federal funding actually slowed many communities' progress toward achieving compliance. When the potential existed for receiving 75 percent of eligible wastewater treatment costs through grants, some governments chose to hold up on needed construction in the hope of receiving federal and state assistance at some future time — sometimes at the cost of delaying economic development and ongoing water quality deterioration.

Federal dominance inadvertently fostered an atmosphere of passive dependency. Action on existing needs and planning for future growth was thwarted as some municipalities stood in the federal waiting line.

Conversely, many communities were not interested in this waiting game and proceeded to find suitable financing solutions on their own. These communities overcame obstacles and realized substantial benefits as they proceeded, thus making the grants trade-off worthwhile. Some notable advantages include cheaper and more efficient construction, ability to select local design preferences, greater responsiveness to economic growth, fewer procedural requirements, enhanced flexibility to address future changes, and greater certainty as to the timing of services to customers.

Local self-sufficiency also results in greater realism in user fees and a recognition that wastewater treatment, like any other utility, should be paid for locally. Accordingly, each household and business has an economic incentive to reduce water consumption once aware of the true cost of wastewater treatment.

Of greater community impact are re-

duced consumption through conscientious use, sound planning, and use of water-conserving technologies and devices to reduce the need for costly expansions or new facilities.

An added benefit, noted by communities that constructed affordable facilities on their own, is the enthusiasm generated by these innovative projects and the real sense of control and opportunity city officials report in assuming responsibility for taking action. Rather than looking immediately to the federal government for solutions, local governments increasingly are mustering their own technical expertise and resources, and are finding innovative and effective solutions to local problems.

For the past year, EPA has been following state, local and private sector activity related to financing pollution control facilities. While the 1981 amendments tolled the phasedown of the construction grants program, states responded by accelerating the establishment of alternative financing institutions.

Currently, 14 states have operational revolving loan programs capitalized at the state level, and another six states have active bond banks. Another 11 states are studying alternative financing programs or have proposed legislation. This increase in state institutional capability to finance infrastructure facilities is an important trend and will play a critical role in assisting communities to attain and maintain compliance.

EPA also has observed a trend away from states simply providing construction funds to municipalities. With increasing frequency, money also is being provided for staff development, operator training and advisory services. States and municipalities recognize the initial investment in attaining compliance must be protected by proper management and operation of facilities throughout their useful lives.

Small communities, in particular, recognize the importance of having access to good information, technical assistance and administrative support as they face the challenge of selecting the most appropriate, affordable technologies, finding the best financing package, and planning for rehabilitation, expansion and eventual replacement of facilities.

A model example of a state-level technical assistance agency is the Municipal Technical Advisory Service (MTAS) based at the University of Tennessee. Established by the state legislature in 1949, MTAS assists cities with technology selection, utility manage-

# Reading Converts Waste

"In a couple of years, this place is going to be a gold mine," says City Councilman Edward Leonardziak of Reading, Pennsylvania, referring to the Fritz Island Sewage Treatment Plant, a sprawling facility situated west of the city. Leonardziak, who oversees the plant's operation, says a cogeneration system installed at the plant will eventually mean money in the bank for Reading, because of the electricity generated.

The cogeneration system consists of a single 200-kilowatt internal combustion/generator and an integrated heat recovery system. Hot water recovered from the engine cooling system and exhaust is used to heat the digester sludge, thereby improving gas production. The primary energy source of fuel for the engine will be digester gas.

Don Howard, superintendent of the sewage plant, estimates the plant will generate electricity 12 hours a day initially — primarily during peak usage times. The electricity will be fed into the area utility's power grid. Payment for the electricity will come in the form of reduced power bills for the plant.

The internal combustion/generator has a life expectancy well into the future, Howard says. The machine is designed to run at between 1,200 rpm and 1,500 rpm, but the Reading facility will operate the engine at only 900 rpm.

"This means the machine will not experience the wear and tear of operating at full-rated piston speed. It should last for as long as we need it," Howard says.

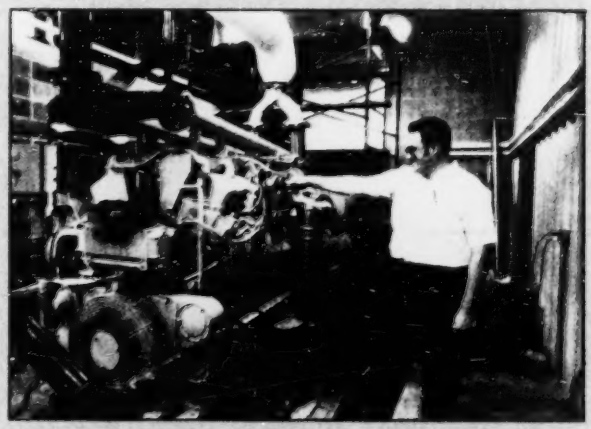
Leonardziak became convinced of the project's viability when Entech Engineering Associates, a Reading consulting firm, conducted the initial feasibility study. Results showed a substantial amount of electricity could be generated by using gas produced at the plant.

"Once we had the results of the study, we decided to go ahead with the whole project," Leonardziak says. Planning for the $500,000 project, funded through a bond issue, began in late 1984, with completion this year. The electricity produced will help reduce the treatment plant's yearly electricity bills, which amount to about $200,000.

The plant has been designated a "qualifying cogeneration facility" by the Federal Energy Regulatory Commission, meaning that under law, a utility, in this case Metropolitan-Edison, must purchase power produced by the cogeneration facility.

Howard says the digesters are set to provide maximum digestion action around the clock. Sludge from the plant is heated to the optimum range of 92 to 96 degrees F. The plant will store gas produced from the sludge for eight to 12 hours. The remainder of the time, the gas will be used to drive the internal combustion/generator.

"It is possible that with proper heating and mixing, the sludge will produce enough gas to run the engine 24 hours



***Don Howard inspects the engine that will provide hot water to heat the digester sludge.***

a day," Howard says. "But everything depends upon the amount of gas produced. That's the key."

Leonardziak says cogeneration for municipal sewage treatment plants is an idea whose time has come full circle. He looks upon the Reading operation as the first of a new generation of similar plants that will be built.

"There's too much energy being wasted," Leonardziak says. "In this era of federal cutbacks, cities that find themselves short of funds are going to be looking for ways to balance their books. One painless way of making money for a city is by making use of waste gases. It's there for the taking.

"It's an expense up front," he adds, "but once you've made the final commitment, the project will pay for itself in the long run. When the cost of energy goes up again — as it is sure to do at some time in the future — I think Reading will be that much further ahead because of cogeneration." □

ment plan preparation, capital improvement program development, user-charge system development, operator and maintenance training, system automation and more.

More recently, New York established a Self-Help Support Program for Small Communities, designed to assist small communities with limited resources alleviate their water and wastewater problems.

Progress has been made in improving water quality, principally through the application of $42 billion in federal construction grants matched by $14 billion in state and local expenditures. Currently, an important evolving federal role is to provide technical information and assistance to states and municipalities on institution building and the establishment of infrastructure funding mechanisms that can provide a continuing source of construction funds.

To help communities meet the 1988 compliance deadline, EPA will be providing financial and technical information to states and municipalities. The agency also will increase assistance to communities, especially smaller ones, in developing affordable and technologically appropriate water pollution control solutions.

EPA also is increasing the distribution of slides, videotapes and brochures on small community wastewater management, and the development of financial management guidance.

Additionally, the agency has been holding small community seminars for local officials to address compliance attainment in the context of financing alternatives, financial capability, use of appropriate technology, and proper operation and maintenance practices.

The United States has come to recognize that clean water is not an inalienable right, available in limitless quantities, but is instead a shared responsibility requiring rational and effective stewardship. Local public officials, for their part, are aware that the value of clean water cannot be measured in cost alone, but must take into account its contribution to a community's economic base and quality of life. □

*Lawrence Jensen is assistant administrator for water with the U.S. Environmental Protection Agency.*

# Composting in Philly

*By Frank Senske*

With the federal government's ban on ocean dumping five years ago, most major seaboard cities, such as Phildelphia, faced hard decisions on sludge disposal methods in the early 1970s. Philadelphia's new sludge management operation would have to meet the needs of a 279-square-mile area, with 2 million people producing 550 million gallons of wastewater a day. In addition, the system would have to satisfy the environmental and fiscal concerns of increasingly aware public and private sectors.

The final solution turned out to be the country's largest municipal composting operation, backed by a $32 million construction program. Several aspects of the project worked in Philadelphia's favor as the project was undertaken.

The Water Department combines the sewer authority and water authority, providing cost-effective operations and a conducive atmosphere for accomplishing mutual objectives. The size of the service area also was a bonus, creating a smaller cost per ton due to the magnitude of the population. Another advantage is the city's prime location, close to transportation networks. Since the city's Water Department owned well-located land, the city had excellent siting options.

The main problems were a rapidly increasing sludge volume and critical lead time. The sludge volume was rising due to a planned upgrade and expansion of Philadelphia's three main water pollution control plants, which were removing a steadily increasing volume of pollutants, causing a heavier volume of sludge from the wastewater. In the mid-1970s, the city produced 50 dry tons per day. Currently, the sludge load is 175 dry tons per day, with 300 tons per day predicted in the near future.

To begin, the city formed the Sludge Management Unit to oversee the project. By 1975, the unit had narrowed the city's options to 10 alternatives, with the most expedient being landfill disposal. The non-revenue producing aspect of this option, however, as well as the realization of decreasing landfill space, kept the city from following this route.

By 1977, the options were reduced to four: incineration, co-incineration, liquid sludge applications and composting. Incineration and co-incineration, the burning of trash and sludge at the same time, were attractive alternatives. These rapid disposal methods offered income-generating possibilities through the use of generated heat for energy production. The capital costs were relatively high, but labor requirements were low.

Ash disposal, siting and lead time forced the rejection of these alternatives. Land composting, however, offered a number of important advantages. The city was attracted to the environmental benefits of recycling the nutrient content of sludge and the marketability of compost as a fertilizer.

Composting also proved to be more cost effective than incineration and liquid sludge application programs. Composting is a natural phenomenon, with most of the real work done by microorganisms. The relative ease of starting even a large-scale composting system and the fact that composting was a proven technology were other factors in the decision.

The city's compost exceeded all expectations, with inventories quickly depleted. As the compost's popularity increased, production also had to be boosted. By 1977, however, processing expenses per ton had risen to $34, and the product's quality was questioned. At that point, the city began purchasing equipment to control costs and produce a soil-conditioning product.

The first piece of equipment was a shredder-mixer, manufactured by Royer Foundry & Machine Co. Fed with front-end loaders, the equipment mixed, shredded and aerated the dried sludge, while automatically removing and ejecting all non-friable material.

Encouraged by its small-scale success, the city began considering the 1 million gallons of sludge produced daily by its wastewater treatment plants for composting. For this amount to be composted, the sludge first had to be dewatered and heated to destroy organic material, pathogens and viruses. The sludge was then trucked to the composting site, where wood chips provided bulk, void space and a carbon source for the working microorganisms.

By the end of 1980, Philadelphia was meeting its objectives. The city no longer was dependent on ocean disposal, and the EPA deadline presented no problems. The city is expanding its composting facilities, and when completed in 1987, the system will have four screens, each producing 300 cubic yards of compost per hour. The city plans to sell 50 percent of the finished compost product, with the balance used in local municipal projects and strip-mine reclamation. □

*Frank Senske is chief of the Sludge Management Unit for Philadelphia's Water Department.*

# MUNICIPAL COST INDEXES

The **Municipal Cost Index** for September leveled at 339.9, a slight rise from August's figure of 338.2 and a continuation of its climb over the past few months.

The **Construction Cost Index** also rose in September, climbing three points to 378.2. The **Consumer Price Index** rose 1.6 points to 327.9, while the **Producer Price Index** continued to fall, dropping to 298.9.

Products in the fuel and oil family continued to lead the losses column in this month's marketbasket, but the declines are beginning to show signs of slowing. Diesel fuel fell only 4.2 points from August, compared to double-digit declines during recent months. Other products showing losses in September included gypsum products, natural gas, plywood and electric components.

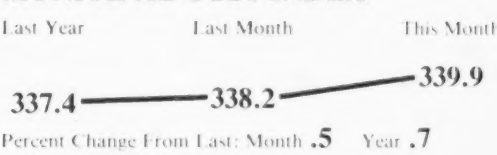
*— Compiled by Joe Morris*

## THIS MONTH'S MARKETBASKET

| | Current Index | Percent Change From: Last Month | Last Year |
|---|---|---|---|
| Air Conditioners | 149.2 | .2 | 1.3 |
| Apparel | 185.3 | −.7 | 1.6 |
| Asphalt Roofing | 387.7 | −1.8 | −5.6 |
| Books | 138.6 | .1 | 4.8 |
| Chemicals, Industrial | 316.3 | −1.0 | −6.8 |
| Coal | 538.3 | 0 | −1.7 |
| Concrete Products | 325.4 | −.2 | 1.2 |
| Construction Machinery | 366.9 | .2 | 1.4 |
| Diesel Fuel | 348.4 | −4.2 | −45.3 |
| Electric Components | 201.0 | .2 | 1.9 |
| Electric Lamps | 347.1 | .3 | 1.1 |
| Electric Power | 464.6 | 2.1 | 1.0 |
| Engines, I.C. | 353.3 | .2 | 1.8 |
| Fans, Blowers | 367.8 | 1.3 | 2.5 |
| Fertilizers, Mixed | 255.3 | .2 | −1.2 |
| Floor Coverings | 195.0 | .1 | 2.7 |
| Flow Instruments | 235.3 | 0 | 1.5 |
| Footwear | 260.7 | −.4 | 1.4 |
| Foundry Products | 364.5 | −.1 | .2 |
| Fuel Oil No. 2 | 379.3 | −6.7 | −41.3 |
| Furniture | 315.8 | −.2 | 2.6 |
| Gasoline | 392.6 | 3.7 | −33.5 |
| Generator Sets | 349.6 | −.6 | −.7 |
| Glass | 229.6 | .2 | 2.1 |
| Glass Containers | 399.6 | 0 | 4.7 |
| Gypsum Products | 353.8 | −1.8 | 4.6 |
| Hardware | 306.5 | .3 | .3 |
| Heating Equipment | 269.7 | 1.1 | 3.9 |
| HVAC Controls | 127.1 | .4 | 1.8 |
| LP Gas | 377.4 | 11.9 | −28.0 |
| Lubricants | 373.0 | 1.7 | −.2 |
| Lumber | 311.5 | 1.0 | 1.4 |
| Metal Fabrications | 315.6 | .2 | .3 |
| Millwork | 320.6 | 1.2 | 2.8 |
| Motor Vehicle Parts | 358.3 | 0 | 1.0 |
| Mowers | 264.0 | .1 | .9 |
| Natural Gas | 1200.1 | −5.8 | −14.7 |
| Office Machines | 154.3 | .1 | −.4 |
| Paint | 281.2 | .1 | 1.7 |
| Paper | 304.5 | .1 | 0 |
| Passenger Cars | 232.9 | −.2 | 1.8 |
| Plumbing Fixtures | 324.2 | .4 | 3.6 |
| Plywood | 235.3 | −2.1 | −.8 |
| Portland Cement | 353.2 | −.6 | −2.9 |
| Residual Fuel | 499.8 | −4.5 | −44.1 |
| Sand, Gravel | 317.8 | .2 | 2.7 |
| Sanitary Papers | 383.5 | .1 | 1.9 |
| Soaps, Detergents | 273.9 | 0 | .1 |
| Sporting Goods | 204.8 | −.1 | .2 |
| Steel Mill Products | 349.3 | .2 | −4.6 |
| Struc. Clay Products | 309.2 | .6 | 4.1 |
| Switchgear | 286.7 | .2 | 2.3 |
| Tires, Tubes | 235.3 | −.2 | −.8 |
| Transformers | 232.6 | 0 | 0 |
| Trucks | 342.8 | −.3 | 2.9 |
| Valves | 106.6 | 0 | 1.6 |
| Wire, Cable | 206.5 | −.2 | 1.6 |
| Wiring Devices | 373.5 | .1 | 3.1 |

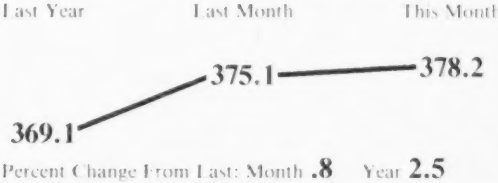
## At-A-Glance Changes

### MUNICIPAL COST INDEX



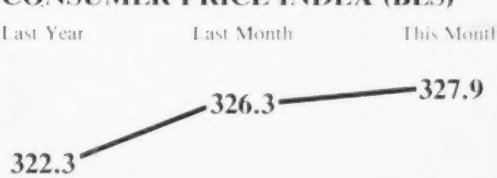

Percent Change From Last: Month .5 Year .7

### CONSTRUCTION COST INDEX




Percent Change From Last: Month .8 Year 2.5

### CONSUMER PRICE INDEX (BLS)




Percent Change From Last: Month .5 Year 1.7

### PRODUCER PRICE INDEX (BLS)

Percent Change From Last: Month −.1 Year −3.4

**These figures are calculated on a base year of 1967.**

## QUARTERLY MUNICIPAL TRENDS

| | Current Level | Percent Change From: Last Qtr. | Last Year |
|---|---|---|---|
| Receipts | 602.5B | 2.3 | 7.5 |
| Federal Grants | 111.0B | 8.8 | 16.0 |
| Durable Purchases | 20.8B | .97 | 6.1 |
| Consumables | 37.9B | −5.0 | 0.8 |
| Services | 364.2B | 2.0 | 7.8 |
| Structures | 56.1B | 2.6 | 17.1 |
| Salaries, Wages | 292.2B | 1.8 | 7.5 |
| Surplus | 64.5B | 9.7 | 2.1 |
| Employment | 13.818M | .14 | 2.5 |